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PLANNING BOARD
GRAFTON, MA

GRAVES ENGINEERING, Inc.
100 GROVE ST. | WORCESTER, MA 01605
T 508-856-0321
F 508-856-0357
gravesengineering.com

July 24, 2017

Joseph Laydon
Town Planner
Grafton Municipal Center
30 Providence Road
Grafton, MA 01519

**Subject: Fieldstone Farms (aka Meadow Lane)**
**Retaining Wall Replacement Plan Review**

Dear Joe:

We received the following documents on July 24, 2017 via e-mail:

- Plans entitled Retaining Wall Replacement Located at Meadow Lane, Grafton, MA dated April 10, 2017 and last revised July 24, 2017, prepared by Land Planning, Inc. for Magill Associates, Inc. (2 sheets)

Graves Engineering, Inc. (GEI) has been requested to review and comment on the plans' consistency with the definitive plans dated February 1, 1994 and last revised November 21, 1994, consistency with the retaining wall replacement goals set in 2012, and standard engineering practices. As part of our initial review, GEI visited the site on June 2, 2017.

This letter is a follow-up to our previous review letters dated June 5, 2017 and July 20, 2017. For clarity, comments from our previous letters are *italicized* and our latest comments to the design engineer's responses are depicted in **bold**. For brevity, comments previously addressed by the design engineer and acknowledged by GEI have been omitted. Previous comment numbering has been maintained.

**Our comments follow:**

1. *The "Culvert Through Wall Section" on Sheet 2 of the plans proposes only six inches of concrete around the culvert pipe and mislabeled the culvert pipe as "RCP" instead of "HDPE." We are concerned about the load being placed onto the HDPE culvert. A reinforced concrete lintel of sufficient strength needs to be designed to span each of the three culvert penetrations, and the mislabeling of the pipe material needs to be corrected.*

   *July 20, 2017:*
   *The design engineer responded that reinforced concrete pipe is to replace the high-density polyethylene pipe at the walls. This approach is reasonable. However, the "Culvert Through Wall Section" construction detail proposes that the two pipe materials are to be butted together with only a "doublewide Mar Mac polyseal repair coupler" to seal (cover) the joint between the two pipe materials. Due to the different pipe materials (rigid concrete and flexible HDPE), one pipe could be displaced from the other due to shear forces. Our research found that in addition to the Mar Mac seal, the pipes need to be protected from movement by using an HDPE "internal coupler spigot adapter" (not recommended for use when the HDPE pipe is downstream from the RCP), a similar bell/spigot-type connection, a coupling connection, or a concrete collar.*

**Acknowledged. The "Culvert Through Wall Section" construction detail was revised to specify a "Fernco Large Diameter Series coupling" at the two pipe joints.**

2. *Information available from the wall block manufacturer indicates that guard rail posts are to be set in a grout-filled Sonotube with a minimum embedment of five feet. The plans propose direct-burial posts embedded only 41" into the ground. The plans need to be revised to meet or exceed the manufacturer's recommendations.*

   *July 20, 2017:*
   *The plans were revised to include a Sonotube whose bottom is five feet below grade with a post length of only 41". The Sonotube offers little, if any, structural strength. Whereas the post is located near the retaining wall and protecting the wall's integrity is important, we understand that the post needs to be embedded five feet (per the wall manufacturer) even if this length exceeds the guard rail manufacturer's recommendation. The detail needs to be revised to provide a post embedment depth of at least five feet and to specify grout between the post and the Sonotube.*
   **Acknowledged. The "Guard Rail Placement Detail" was revised to show the post embedded five feet.**

4. *On Sheet 1, the individual blocks weren't labeled on the two retaining wall elevations. Standard practice for wall systems such as the one proposed is to label the block type (e.g. 60B, 60M, 45M, 24T) of each block to avoid confusion during construction. For example, there are sections of the walls that require nine courses adjacent to sections that require ten courses, each of which requires different base blocks.*

   *July 20, 2017:*
   *The blocks were labeled as requested. On the right side of the "North Retaining Wall Elevation" there are two base blocks labeled as 60M that need to be revised to 60B.*
   **Acknowledged. The remaining two labels on Sheet 1 were revised.**

7. *The retaining wall is available in various textures. The plans do not propose a texture; we recommend that the design engineer coordinate a texture with the Planning Board.*
   **GEI has no issue with the proposed North Shore Granite texture; we defer final consideration of the texture to the Planning Board.**

8. *GEI did not perform a structural engineering peer review of the proposed replacement wall. Such a review is beyond the scope of this general civil engineering peer review.*
   **No further comment necessary.**

We trust this letter addresses your review requirements. Feel free to contact this office if you have any questions or comments.

Very truly yours,
**Graves Engineering, Inc.**

Jeffrey M. Walsh, P.E.
Vice President

cc: Norman Hill, P.E., P.L.S.; Land Planning, Inc.
Maria Mast, Grafton Conservation Department
Bob Berger, Grafton Building Department
Brian Szczurko, Grafton Engineering Dept.
Dave Crouse, Grafton DPW
Paul Cournoyer, Grafton Sewer Department